FIG. 4 is a graph showing power values where horizontal components of DCT coefficients are in a low region and vertical components thereof are in a high region (horizontal line portions in FIG. 2) or power values where horizontal components of DCT coefficients are in a high region and vertical components thereof are in a low region (vertical line portions in FIG 2);

FIG 5 is a view illustrating changes in number of coefficients among sixty-four DCT coefficients whose absolute value components are larger than threshold values previously set in a DCT coefficient counter on the picture basis, and

FIG. 6 is a block diagram showing a configuration of an apparatus for re-coding an image signal disclosed by Japanese Patent Application Laid-open No. Hei 10-32829

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiment 1

FIG. 1 is a schematic block diagram showing a configuration of an apparatus for re-coding an image signal of Embodiment 1 according to the present invention

In FIG. 1, a pre-processing portion 13 in Embodiment 1 is composed of a DCT unit 50 for subjecting an input image signal to a discrete cosine transform (DCT), a DCT coefficient counter 51 for counting feature amounts on the picture basis, using a DCT coefficient output from the DCT unit 50, and a picture type detector 52 for detecting a picture type in coding processing in the previous stage, using the feature amounts output from the DCT coefficient counter 51. The remaining parts are the

same as those in the conventional example. The coding control portion 11 determines coding parameters in re-coding in accordance with results of detection of a picture type, and a coding portion 12 conducts re-coding processing using the determined coding parameters.

Next, an operation of the above-mentioned re-coding apparatus will be described.

An input image signal 31 is input to the DCT unit 50 of the pre-processing portion 13. The DCT unit 50 conducts the same two-dimensional DCT as that conducted in general image coding, and outputs DCT coefficients 61 composed of sixty-four frequency components. FIG. 2 shows frequency characteristics of sixty-four DCT coefficients output from the DCT unit 50.

The DCT coefficient counter 51 obtains the sum of absolute values or the sum of squares on the frequency component basis for each picture unit, and outputs an power value 62 of each frequency component. Alternatively, an average value may be obtained on the frequency component basis, and the sum of absolute value differences or the sum of square differences may be obtained from the average value.

The picture type detector 52 detects a picture type of each picture.

FIG. 3 is a graph showing power values where horizontal components of DCT coefficients and vertical components thereof are both in a high region (shaded portions in FIG. 2). FIG. 4 is a graph showing power values where horizontal components of DCT coefficients are in a low region and vertical components thereof are in a high region (horizontal line portions in FIG. 2) or power values where horizontal components of DCT coefficients are in a high region and vertical

components thereof are in a low region (vertical line portions in FIG. 2). A picture that is an I-picture in coding processing in the previous stage has a tendency of having insufficient high-frequency components of DCT coefficients, compared with a P-picture and a B-picture, for example, as represented by circles in the graph shown in FIG. 3. Therefore, a picture whose electric value 62 of a high-frequency component is smaller than those of the previous and subsequent pictures is detected as an I-picture. More specifically, a picture whose previous and subsequent pictures have a deviation of power values that is smaller than the previously set value is detected as an I-picture.

Furthermore, in coding processing in the previous stage, pictures that are an I-picture and a P-picture have a tendency that power values of low-frequency components of DCT coefficients are increased compared with a B-picture, for example, as represented by circles in the graph shown in FIG 4. Therefore, a picture whose electric value 62 is larger than those of the previous and subsequent pictures is detected as an I-picture or a P-picture. More specifically, a picture whose previous and subsequent pictures have a deviation of power values that is larger than a previously set value is detected as an I-picture or a P-picture. Therefore, by combining FIGS. 3 and 4, an I-picture is detected from FIG. 3. If positions of circles detected as the I-picture are eliminated from FIG. 4, a P-picture can be specifically detected.

The coding control portion 11 sets various coding parameters in accordance with a picture type detected by the picture type detector 52, and controls coding processing of the coding portion 12.